Remarks

Applicant has read and considered the Office Action dated November 18, 2003 and the references cited therein. Applicant respectfully requests reconsideration in view of the following remarks.

In the Action, claim 21 was rejected under 35 U.S.C. § 112 as failing to comply with the written description. Claim 21 has been cancelled.

Claims 1, 2, 3, 6, 7-9, and 17-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by *Lohmann*. Applicant has once again reviewed the *Lohmann* reference and respectfully asserts that the rejections should be withdrawn as the reference does not disclose the Applicant's invention.

Regarding claims 1, 2, 3, and 6, the Office Action states that *Lohmann* discloses a guard for a crop collecting apparatus, the guard comprising a straight elongate member, each end having at least one mounting orifice formed therein, wherein the elongate member is coiled in an arcing configuration when mounted and returns to a straight configuration when removed, and wherein the guard is adapted for mounting under tension, as per claim 2, and wherein the mounting orifice has a countersunk portion, as per claim 3, and wherein the elongate member includes a plurality of mounting orifices, as per claim 6.

Applicant respectfully traverses the rejection. The *Lohmann* reference neither teaches nor suggests the recited structure. The *Lohmann* reference discloses a spring steel strip as element number 6 in the application, but the disclosure does not identify the spring steel strips prior to mounting as being straight elongate members. The *Lohmann* disclosure merely mentions that the strips are fastened to lateral bent webs and makes no mention of removing the strips once fastened. The only place where *Lohmann* teaches the resulting arcuate formation of strip mounting is in Figure 1, but the disclosure fails to provide evidence of that the strip is not the same shape as when mounted. Also, *Lohmann* does not disclose that the strips, upon removal from the drum, return to their pre-fastened configuration. In fact, *Lohmann* does not disclose

ever removing the strips for any purpose. The *Lohmann* reference made a claim that because the steel strips can withstand a "particularly high pressing force" the "frequency of repair is thus reduced" and such reduced frequency of repair is "surprising to one skilled in the art." This claim leads a person of ordinary skill in the art to understand that the steel strips would rarely need to be changed and therefore Applicant's invention is not taught.

In addition to *Lohmann* not teaching or suggesting the claimed invention, it is not physically possible for the strips of *Lohmann* to function as asserted by the Examiner. The Examiner stated in the Office Action that it is known in the art that steel is manufactured from sheets which are straight and flat and that *Lohmann* teaches the use of spring steel strips which would return to their natural configuration upon removal from mounting. Applicant respectfully disagrees with Examiner's interpretation of what *Lohmann* teaches. The metallurgical concept of "springback" is defined as the tendency of a piece of flat metal after being formed, that upon release of a forming force, the material has a tendency to partially return to its original shape because of the elastic recovery of the material. As the Examiner correctly points out, *Lohmann* discloses the use of spring steel, but *Lohmann* is silent as to the configuration of the spring steel strip prior to mounting. The drawings in *Lohmann* only show a coiled strip and *Lohmann* does not discuss the mounting or removal of the strip. One would not assume that the strip was not coiled before mounting. Applicant's polyethylene material, specifically disclosed as a straight elongate guard member, can withstand a significantly higher degree of elastic deformation and subsequently return to its original configuration when compared with the steel strips in *Lohmann*. Polyethylene has a Modulus of Elasticity much greater than spring steel, which means that polyethylene can be deformed to a higher degree than spring steel before fatigue and permanent deformation arises. Applicant respectfully asserts that the polyethylene guards of the present invention have a springback potential greater than that of spring steel and that a spring steel strip could not completely return to a straight configuration upon removal from attachment.

Applicant respectfully submits the following equation governs coiling of material before permanent deformation occurs:

$$Dy = tE/Y$$

where "Dy" is the yield diameter (in inches), where "t" is the material thickness, where "E" is the Modulus of Elasticity (in pounds per square inch), and where "Y" is the material yield strength (in pounds per square inch). *See* http://www.thefabricator.com. Using this equation, the yield diameters of spring steel and Applicant's polyethylene material can be compared and it can be seen that spring steel could not function as a crop harvester guard and return to a straight configuration. The yield diameter is essentially the same as the yield point of a material: yield point being defined as the point where a tensile test piece begins to extend permanently, then if the load is reduced to zero on the material, the test piece will not return to its original length.

Applicant respectfully submits that the Modulus of Elasticity of spring steel is known in the art as being roughly 30,000,000 PSI and the yield strength is roughly 40,000 PSI. *See* http://www.key-to-steel.com/Articles/Art41.htm; http://www.thefabricator.com. The Modulus of Elasticity for Applicant's material is 100,000-150,000 PSI with a yield strength of 2,900 to 3,500 PSI. *See* http://www.symplastics.com/products/ramex_properties.html. Using these figures in the aforementioned equation with an identical material thickness of 1/8 inch, a typical spring steel sheet thickness, produces a yield point diameter of 93.75 inches for spring steel and 4.3 inches for Applicant's material. This result proves that a typical spring steel strip cannot be bent in a diameter any smaller than 93.75 inches without undergoing a permanent deformation. In fact, Applicant's material would have to be 2.7 inches thick to experience deformation at the same level of spring steel. Moreover, a diameter of over 93 inches is not acceptable for a crop collecting apparatus where a goal is to reduce the diameter of the guards so that the axis of the collector arbor is as close as possible to the ground. A typical diameter being in the range of 18 inches.

Applicant submits that such results gleaned from an accepted steel industry standard equation proves that the spring steel material must have been shaped prior to mounting in the

Lohmann reference, in which case the strips would not return to prior configurations. Conversely, if the strips were not shaped prior to mounting, the strips would surely be permanently deformed upon mounting and subsequently could not return to a prior straight elongated configuration. In either example, the spring steel does not return to prior configurations and therefore *Lohmann* does not teach the guard mounting method of Applicant's invention. Applicant further submits that because the yield point of spring steel is greater than that of Applicant's material, any further bending of the spring steel past the yield point will create a permanent bend whereas Applicant's polyethylene material can be bent to a much smaller diameter before permanent deformation is experienced. As the *Lohmann* reference is not directed to allowing easy access to the tines and arbor, there is no motivation to provide guards that straighten. One of ordinary skill in the art would not find it obvious to provide the structure recited in the claims upon review of *Lohmann* and its coiled spring steel strips. Physics of spring steel prevents its use as a suitable guard that straightens when released. Moreover, there is no motivation or suggestion to use a material that may function in an acceptable manner.

Regarding claims 7-9, the Office Action states that *Lohmann* discloses a guard for a crop collecting apparatus wherein the method is inherent, the method comprising the steps of providing a substantially straight elongate guard member having mounting means at a first end and a second end, mounting the first end to the crop collecting apparatus, coiling the guard member in an arcuate configuration around a portion of the head, mounting the second end to the crop collecting apparatus, as per claim 7, and wherein the guard member is mounted under tension, as per claim 8, and wherein the mounting means comprise ends with orifices formed therein, as per claim 9.

Applicant respectfully traverses the rejection. The *Lohmann* reference fails to disclose the series of steps necessary to fasten the steel strip to the drum and a person of ordinary skill in the art would comprehend that the strip is applied to the drum in a single step as a pre-formed strip. The *Lohmann* reference merely discloses that the strips are fastened to the drum by engaging the strip on bent edges. This fastening engagement disclosed in *Lohmann* is not equivalent to Applicant's mounting of the first end, coiling the elongate member in an arcuate

configuration and then mounting the second end. *Lohmann* could not fasten the strips in the same way.

Regarding claim 17, the Office Action states *Lohmann* discloses a crop collecting apparatus with the following method for accessing a crop collection reel, the reel having at least one guard mounted at a first end and a second end in a flexed condition arcing around a portion of the reel under tension is inherent, the method comprising the steps of detaching only the first end of the guard and releasing the first end of the guard, wherein the guard returns to a straight configuration upon release of the first end, pulling the guard from around the axle and extending outward from the attached second end.

Applicant respectfully traverses the rejection. Again, *Lohmann* fails to disclose the process of fastening the strip to the drum beyond an engagement with bent ends. The *Lohmann* disclosure does not mention an inherent tension within the mounted strips and further, the *Lohmann* reference makes no mention of flexing the steel strip. Such a total lack of disclosure would lead a person of ordinary skill in the art to comprehend that the coil was formed prior to mounting. While *Lohmann* made reference to the high pressing force applied to the strips, no reference is made to the tension on the strips.

Regarding claims 18-19, the Office Action states *Lohmann* discloses a crop collecting reel for mounting to a crop collection apparatus, the reel comprising an arbor, a plurality of tines including tine sets having tines spaced apart radially around the arbor, wherein the tine sets are spaced along the arbor, a housing comprising a plurality of substantially straight elongate guards intermediate adjacent tine sets, wherein the guards are configured for mounting to the crop collection apparatus in an arcing configuration, as per claim 18, and wherein each of the guards returns to a substantially straight configuration when one end of the guard is released, as per claim 19.

Applicant respectfully traverses the rejection. *Lohmann* merely discloses that the strips are mounted between each rotating row of tines and does not disclose any series of applying or removing the strips from the drum.

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Lohmann* and *Fritz* in view of *Engel*. The Office Action states that the combination is disclosed except for a guard comprising a polyethylene member, but that *Engel* disclosed a tine stripper wherein the stripper comprises a polyethylene member, but not the shape or properties recited in the claims. The Office Action states that the obviousness arises because one with ordinary skill in the art would use polyethylene because of its high wear tolerance. Applicant respectfully asserts that the Applicant's invention concerns the ability of polyethylene to be shaped around the apparatus, providing dual benefits because of its high wear tolerance and being able to be removed from the apparatus and instantaneously return to a previous shape without suffering adverse deformation. None of the cited references address these problems. Such elasticity allows easy maintenance of the apparatus and tines, and neither *Fritz*, *Engel*, nor *Lohmann* individually or in combination disclose such a benefit.

Claims 10-12, 16 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Gallagher et al.* in view of *Lohmann*. The Examiner states that Gallagher teaches a crop collection apparatus wherein the guards comprise substantially straight elongate steel strip members. As stated above, the spring steel strip members have inherent physical properties that would require pre-bending rather than bending around the reel as Examiner suggests. Moreover, as recited above, *Lohmann* does not teach maintenance of the apparatus because of the ability of spring steel to withstand high pressing forces, suggesting that the spring steel strips are durable and have a high wear tolerance.

Claims 13 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Lohmann* in view of *Engel*. The Office Action states that Lohmann substantially discloses the claimed device, but fails to disclose that the elongate member comprises polyethylene as recited in claim 13 and that the elongate members comprise ultra-high molecular weight polyethylene as recited in claim 15. As stated above, Applicant asserts that neither *Lohmann* nor *Engel* disclose the crop collection apparatus as recited in claim 10. The *Engel* reference teaches the use of polyethylene because of its high wear tolerance, but does not teach the flexibility and elasticity benefits of polyethylene. Moreover, neither of the references teach or suggest the combination

stated above. Applicant asserts that claims 13 and 15 patentably distinguish over the cited references.

Claim 22 was rejected under 35 U.S.C. 103(a) as being unpatentable over *Lohmann* in view of *Fritz*. As stated above, *Lohmann* neither teaches nor suggests the guard. *Fritz* teaches only a tapered end and combining the references would not lead one of ordinary skill in the art to achieve the present invention.

A speedy and favorable action on the merits is hereby solicited. If the Examiner feels that a telephone interview may be helpful in this matter, please contact Applicant's representative at (612) 336-4728.

Respectfully submitted,

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